Koch's discovery xxxxx

Timely Topics

—FOR—

Medical Men

Koch's Discovery—(Illustrated).

Alimentation as a Therapeutic Measure.

COMPLIMENTS OF

THE ARLINGTON CHEMICAL CO.

YONKERS, N. Y.

SUCCESSORS TO

REED & CARNRICK

FOR

PEPTONOIDS BEEF (Powder)
PEPTONOIDS LIQUID.
PEPTONOIDS LIQUID, WITH COCA.
PEPTONOIDS, IRON AND WINE.
PHOSPHO-CAFFEIN COMPOUND.

PEPTONOIDS BEEF

(POWDER.)

Sterilized { BEEF, MILK, GLUTEN, } Partially Peptonized.

THE MOST CONCENTRATED AND NUTRITIOUS FOOD IN THE MARKET.

Received the only GOLD MEDAL and Highest Award at the International Health Exhibition, London, after a critical examination of all the Beef and Concentrated Food Productions, by a Jury composed of the best Chemists in Europe.

In the preparation of **BEEF PEPTONOIDS**, the flesh-forming elements of *beef*, *wheat* and *milk* are used, constituting a nitrogenous and nutritive food of the highest value. It is not an "*extract of beef*" as ordinarily understood. We use the *entire nutritive product of lean meat*, excepting the large muscular tissue, from which the water has been previously evaporated.

BEEF PEPTONOIDS in the form of powder is not a pure peptone, it being only partially digested. It is not desirable, except in extreme cases, to entirely anticipate the natural digestive functions.

The Government Chemist at Washington has recently analyzed a large number of food products, the result of which showed Powd. Beef Peptonoids to be much the highest in nutritive value. These analyses are made for private use, and are not allowed to be published, but we have no doubt any physician can obtain this information by correspondence.

During the past two years POWD. BEEF PEPTONOIDS *has been employed by surgeons in the British service, among Coolies, where the percentage of mortality was very great. It was found to reduce the death rate so largely that it was placed on the "requisition list," and is now ordered in large quantities for use in this special field.*

The use of **BEEF PEPTONOIDS** is indicated as follows:

Convalescence from all diseases, Pulmonary Affections, Pneumonia, Phthisis; Dyspepsia, Weak Digestion, Gastritis, and all Stomach Ailments; Fevers, Diarrhœa, Dysentery, Cholera Infantum, and all Intestinal Diseases; Marasmus, Vomiting in Pregnancy, Sea Sickness, Bright's Disease, Diabetes and Excessive use of Alcoholic Stimulants. Beef Peptonoids may be given per rectum in all cases where the stomach can not digest the food, and in debility resulting from any cause. It is a valuable adjunct in voyages and camp life.

FROM MANY HUNDRED LETTERS RECEIVED FROM PHYSICIANS AND CHEMISTS, WE PRESENT A FEW EXTRACTS IN THE FOLLOWING PAGES:

Prof. Attfield says of Beef Peptonoids: "It is by far the most nutritious and concentrated Food I have ever met with."

Prof. Stutzer says: "If a medical man desires to give an invalid or convalescent a preparation by the use of which the formation of flesh and blood is to be promoted and vigor infused into a patient, Beef Peptonoids for this purpose stands first and foremost amongst all the preparations I have examined."

In an article on "Feeding Phthisis." in *Phil. Med. News*, Dr. Solomon Solis Cohen says: "The preparation from which the writer has seen the greatest benefit, and which he is most frequently in the habit of prescribing, is Beef Peptonoids. Whether from improvement in the process of manufacture, rendering it more palatable, or from decrease in the fastidiousness of patients, there has not recently been the same difficulty in getting patients to persevere in the use of it that was experienced in former years.

"The methods of administration may be varied almost indefinitely. It may be added to soups and broths, to milk punch, egg-nog, etc., taken in warm or cold water, or made into paste wtth milk or water and spread upon bread. Beginning with a teaspoonful three or four times a day the amount is to be increased, as soon as the preferable method of administration is determined upon, to a tablespoonful or more. It is preferably given among the supplementary articles of diet between meals."

THE ARLINGTON CHEMICAL CO., Yonkers, N. Y.

Koch's Discovery—An Interview with Prof. Koch.

"My hour of consultation is between 12 and 1 o'clock." Signed "Koch." This is written on a little square piece of paper fastened by four pins in a gray frame against the wall at the foot of the grand staircase in the entrance of the Imperial Hygienic Institute, in Berlin, and it was this that four European reporters were studying on the 5th of November, at 9 o'clock in the morning. Alas! what an illusion! Many others have been stopped by that little card, and gone no further. It is not easy, in fact, to reach this celebrated savant. From the porter to the secretaries, every one is extremely reserved in that house. It is almost impossible not to have one's card intercepted before it reaches its destination. We had the good fortune, nevertheless, to overcome all obstacles, and by exceptional favor obtained admission. We are going to try to lift a corner of the veil under which the German sphinx lies hidden, and to show to all the world the great question of the cure of consumption and by what intellectual and experimental processes the present condition of the science has been reached.

The intimate friend and adviser of Dr. Koch received us in his private study on the third floor of the institute. On the door is a little card on which are the words "Dr. Koch." The room is very small, and is partly filled by an enormous stove of faience, which reaches to the ceiling, and opposite to it is a large table covered with green and provided with two drawers. At the end of the room near the window is a little oak bureau, on which we perceived two proofs of photographs of which so much has been said, and which ought to be annexed to the report which is waited for with so much impatience. They represent two forearms with a hand showing the scars of tubercular lesions that have been cured, and photographs of which have been taken from day to day.

Prof. Koch immediately arose and stretched out his hand to me.

"I am very pleased to meet you," said he. "I remember very well our former intercourse at Marseilles, at the time of the cholera in 1885. I remember also that you were the first one to translate my works and discoveries, but," and he held my card in his hand, "I guess the cause of your visit, and regret to say that I will not be able to tell you all I would like."

"Nevertheless," I replied, "the French public wish to know you, and to know and to see something of you and of what relates to your researches. That you will certainly grant me. In the first place, let me ask for your photograph signed."

I then asked him for a tube containing some bacilli. Prof. Koch passed immediately into a neighboring room and came back holding in his hand a tube containing the *culture*, which he gave to me.

"Will you authorize me to say that these came directly from your laboratory and were given to me by you?"

"You know very well that I am a simple man, and how much I fear the notoriety which has arisen. Nevertheless, you desire it, and I give you the authority."

"Since you are in the vein, what would you think of letting me have a tube of the *culture* of comma bacilli of cholera? You are probably the only person in

the world who has the germs of cholera bottled up, and it will be interesting to show as coming from the author of the discovery."

"It is not necessary for me to recommend to you the greatest prudence, as these bacilli are virulent."

"Certainly I shall destroy them just as soon as I finish using them. I would like to give photographs of the laboratory."

"As you please. You can have what you wish except the small room at the rear. I am going to ask Dr. Pfeiffer to assist in making photographs of my laboratory of bacteriology, especially that part of it which relates to my work and where my experiments are made. He will give you all the information you need."

Dr. Koch was born December 11, 1843, at Clausthal, where he first attended school. From 1862 to 1866 he studied medicine at Goettingen; then, having become a professor of medicine, he commenced his practice at Posen.

A few years later he was chosen professor and commenced his first work on the study of tuberculosis. He discovered the bacilli, he studied it, and settled the fact that consumption is caused by a bacillus. This work at once put him in the very

FIG. 1.—THE BACILLI OF CONSUMPTION, FROM NEW MUCUS EXAMINED UNDER THE MICROSCOPE.

first rank, so that in 1883 he was sent by the Prussian government to India to make a study of cholera and to discover the cause of that infectious malady. This time again success crowned his efforts, and it is admitted to-day without doubt that cholera is caused by comma bacilli (a name which Dr. Koch himself gave it on account of its resemblance to the comma), as tuberculosis is caused by the Koch bacilli. As a reward for his services, on his return the State voted him a purse of $25,000. The importance of the work of this German savant was thus recognized, and it appears

Koch.

ROBERT KOCH, DISCOVERER OF THE CURE OF CONSUMPTION.

that he is justly entitled to be considered one of the most extraordinary persons of our time. It may be well to mention at this point that according to Koch there is no fear of cholera returning to Europe, or at least it will not pass beyond some of the countries of the South. Berlin with its remarkable system of sewerage, and Paris also, have nothing to fear from that terrible malady. This is certainly reassuring. Thus it may be seen that the object of all of Professor Koch's work is the discovery of the cause of infectious diseases. He is satisfied that what he has done for tuberculosis and cholera, and what others have accomplished for other maladies that are less deadly, such as erysipelas, could also be done for all diseases, whatever they may be. From this it may be seen that his labor on behalf of science is not yet finished. It appears in fact that Koch has for the time being abandoned the examination of microbes for that of their destruction in the living human body. It is well known, thanks to him, that consumption is occasioned by microbes whose presence in the lungs, as, for example, in the case of pulmonary tuberculosis, occasions the phenomenon of phthisis. It is useless in treating this disease to repeat the errors of the past by the use of tonics and by telling patients to avoid taking cold, and even, when some new specific has been discovered, to force the patient to swallow it;

FIG. 2.—THE SAME BACILLI EXAMINED UNDER THE MICROSCOPE AFTER A PERIOD OF DEVELOPMENT OF FOURTEEN DAYS.

all this and the use of a hygienic *regime*, and certain remedies resorted to in the treatment of phthisis, have accomplished nothing, and patients continue to suffer and resist the disease a longer or shorter period of time. Dr. Koch abandoned this well-beaten road; he threw aside everything which did not rest upon the solid scientific basis; all the experiments that had been made, from the benzoic acid to the hot air method, all that is an illusion because it is based on a misconception.

Prof. Koch first commenced experiments with a tube which we represent. It is an ordinary test tube, such as is used in all ordinary experiments. It is, in the first place, sterilized over the fire, then a bouillon of sterilized *culture* is poured into it, that is to say, *culture* which does not contain any germ. This bouillon is pre-

pared with agar-agar, a sort of gelatine. When this has been done the microbe, which is taken directly from the mucus of a consumptive, is placed in the tube and the orifice is closed with cotton, thereby permitting the air to pass into the vessel, but retaining the organisms, which are held suspended therein. The tube thus prepared is subjected to an even temperature in an oven. After a certain length of time the microbes begin to develop and increase, and assume the clotted appearance which we see in one of the engravings, and which is one of the characteristic peculiarities of consumption. But in order to experiment effectually it is necessary to have the *culture* absolutely pure, and it is obtained in this manner: In the first place take some of that treated as above and place it in another tube. This is repeated, and after fifty or sixty successive changes of this nature a residuum is obtained which is called pure *culture*, that is to say, it contains absolutely nothing but the microbe which it is desired to study. The pure *culture* of bacilli of tuberculosis is repre-

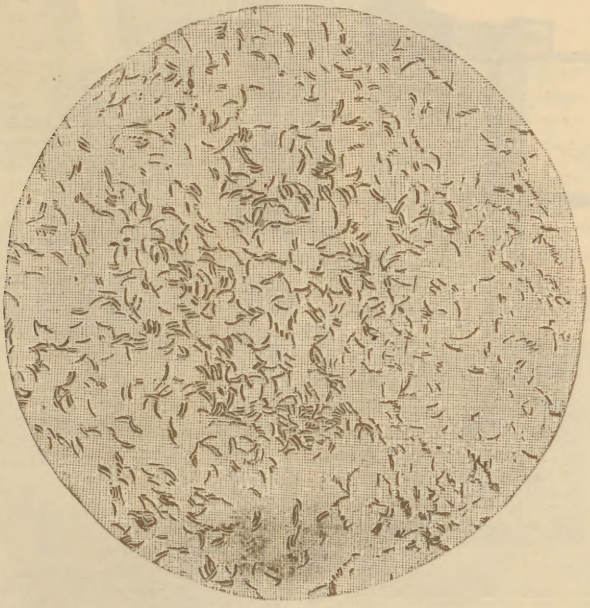

FIG. 3.—THE SIMPLE CULTURE OF BACILLI OF TUBERCULOSIS EXAMINED UNDER THE MICROSCOPE.

sented in the photograph which we have reproduced, Fig. 3, the negative of which came from the Koch laboratory. It gives perfectly the idea of what may be seen in the field of the microscope. Each one of the black points which are seen in the photograph represents a bacillus, that is, a pathogenic organism, which is the cause of the disease and which was discovered by Koch. It was upon these pure *cultures* that Koch made his first experiments, to try upon each one a long series of chemical

DR. KOCH AT WORK IN HIS LABORATORY.

reagents, of which the following are the principal: In the series of ethers, etherized oil; of the series of aromatics, *B* naphthaline, para-toluidine, xylidine, fuchsine; among the colors, gentian violet, methylene blue, China yellow, aniline yellow, orimene; of metals, tin, silver and gold. He found the action upon the last of these the most energetic of all.

It only required one or two millionths of chloro-cyanide of gold to stop all development of bacilli of tuberculosis in pure *culture*. It is seen what an enormous amount of time and trouble was required to make all these tests. Koch saw not only that all the substances which we have cited, but many others with which he experimented—a list of which would be too long for us to give—have the power in a test tube of arresting the development of bacilli of consumptiou. He had, therefore, finished the first part of his programme in searching for the substances which, when mixed with pure *culture* of bacilli of tuberculosis, were able to arrest their develop-

FIG. 5.

FIG. 6.

FIG. 5.—TUBE CONTAINING THE GERMS OF BACILLI OF TUBERCULOSIS FROM THE LABORATORY OF DR. KOCH.
FIG. 6.—TUBE CONTAINING THE GERMS OF COMMA-BACILLI OF CHOLERA FROM THE LABORATORY OF DR. KOCH.

ment. He passed on then to the second part of the programme, viz., experiments upon animals. He selected the guinea pig as a subject, because of all animals this is the most liable to tuberculosis when inoculated. He tried all the substances mentioned in the above list upon the guinea pigs thus rendered consumptive, and he observed that although the action of these substances was so remarkable in the test tube, there was no apparent result when they were applied to the animal. All the inoculated guinea pigs died of consumption. Without being discouraged, however, he undertook a second series of experiments, also upon living animals. He succeeded

in discovering a substance (and it is here that the secret begins) which, active in the test tube, preserves its action when it is transferred to the body of the animal. Upon the second series of guinea pigs which had been inoculated, the increase of the bacilli was stopped as soon as the substance was administered, and all were cured. Here it is necessary to rectify an error which the journals have spread. It is known that he made his experiments upon a large number of animals, and every day one of this number disappeared, and it was supposed that it was one of those that had been inoculated. No, it was simply that he killed one from day to day because he wished to follow all the stages that were reached. In all the autopsies it was found that the lesion was stopped as soon as the substance was injected, no matter what stage of development the disease had reached. He was, therefore, able to let a certain number of ex-consumptives live, and they are to-day in a perfect state of health.

It was after these two series of investigations, which were so long, that having arrived at a definite result, he was enabled, before the Congress of Physicians held in Berlin in August last, to make his first communication, which caused so remarkable a sensation. This is what he said in concluding his remarks: "My researches are not yet entirely finished, and I am only able to affirm one thing, viz., that the guinea pig, which is, as every one knows, liable to consumption, became entirely free from it the moment that it had absorbed this substance, and from that moment the disease was arrested and its progress stopped, whatever may have been the stage previously reached, and that also without the constitution being in any way impaired. I am only able to draw one conclusion from these researches, viz., the possibility which exists from this way of paralyzing absolutely the action of the microbes in the animal. It is a new field open to experiment and observation." These were exactly, word for word, the conclusions of Dr. Koch in the month of August last, and it is on a false interpretation, or rather on a premature conclusion, that the idea was created at that time that his researches had attained to the cure of consumption in the case of man. Dr. Koch had not even made allusions to this. It was only later, and following always the idea and the scientific methods which have always guided Dr. Koch, that he began to experiment upon man, guided by the definite results already obtained upon animals and with a feeling of certainty that like results would follow.

With a simple Pravas syringe and drops of the liquid, the consumption disappears and the hectic flush is modified; the patient is cured; and if Dr. Koch is not yet willing to divulge his secret, it is because he is wise in his own opinion, founded on scientific principles, and that he is not willing to leave one iota of error. He was able to kill and examine his guinea pigs when he wished to know the degree of advance in their cure; but he can not follow the same course with men. He is no longer experimenting, he is curing. He is obliged to wait until his cure is complete and absolute. When the last of his patients is a well man, he will speak, and we shall know all. Before then he will say nothing. This is the cause of his delay in satisfying a public curious and anxious to know all. These are the sorts of discoveries that open up the infinite horizons of science and elevate to the highest pinnacle the one who has conducted the experiments; and one is compelled to respect the true savant, who fears notoriety, and who will quietly and modestly bestow, some day, this cure upon humanity, without any recompense (in spite of offers of all kinds, which come to him from every side), without any other profit than adding one more leaf to the already beautiful crown of that modern science of which the French genius, in the person of the great Pasteur, has furnished the elements, founded the principles, and brought about such magnificent results.—*By D. Charles Hacks, in "L'Illustration."*

ALIMENTATION AS A THERAPEUTIC MEASURE.

"The medical man who contents himself with merely prescribing definite forms of medication, and does not at the same time provide for the diet and nourishment of the invalid, neglects to avail himself of a most valuable auxiliary."—**WARING**.

Never was a thought more pregnant with truth. Fortunately, however, in these later days the importance of dietetics is becoming more and more recognized, and their study, both in practice and theory as accessories to the exhibition of drugs, has led to better results, not alone in the care of convalescents, but in the very onslaughts and heights of disease.

"Directly man begins to live, he begins to die," says the erudite Thomas Hawkes Tanner. Food is life, and the various and divers ways in which it may be utilized are legion; the very foundation of the *cusine* was a recognition of the principle of economy in nourishment. The physiological relations between the alimentary canal and the organism at large are most intimate, and doubly manifested with the onslaught of disease. Appetite, too, and the sensations of hunger and thirst, far from being mere local manifestations, are the demands made through the central nervous system by the economy as a whole, for a renewal of material of which it has been deprived, or that has disappeared in the form of waste. Thus existence is but a succession of wastes and repairs, so much so that the older physiologists were wont to assert that with each cycle of seven years the physical system is wholly renewed.

Repair must have its source from without, hence the ingestion of food in response to the demand. Then follows digestion, a complex act whereby the aliment is comminuted and transformed into material available for assimilation. Assimilation presents the process whereby the nourishment is taken up by the absorbents and converted into sources of energy, viz., blood, bone, and nervous and muscular tissue. So exact is this adjustment between waste and repair, that a mere trifle, apparently, may disturb the equipoise, constituting morbidity. In other words, if the aliment be deficient in quantity and quality, the processes of digestion are interfered with, and there is waste without corresponding repair, when a pathological condition supervenes known as inanition. The organism as a whole is lowered in tone to enable it to compensate for, and adapt itself to, the circumstances of supply, and thus it easily becomes a prey to other and external morbid influences; or perhaps the latter may be coincident with, and a cause of, the former. Were it not for these waverings of the balance and disturbances of the normal equilibrium, determined by individual acts and surroundings, or latent through heredity, there would be no disease, and the debt man "owes to Nature" could only be paid by acts of violence.

Inanition is itself decay, none the less certain because it is insidious; it is slow starvation, and attended by the same phenomena as accrue to immediate and total withdrawal of all nourishment. All parts of the organism, however, are not equally affected. Those which can be utilized as nitrogen and carbon are first consumed in the endeavor of Nature to compensate or restore. The capacity of the economy to sustain itself for considerable periods of time, without the ingestion of nourishment, and in spite of constant excretion with diminution of body weight, is well understood by physiologists. The fact is, the organism in perfect health possesses within itself a fund that is added to day by day, the supply always being a

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trifle in excess of the demand; and this is a matter of no small consequence in conditions of disease. If each day's nourishment exactly balanced each day's force, existence would be most uneven, and the dangers of disturbance to the vital mechanism greatly enhanced: but by a system of storage, a proportion is saved under favorable circumstances to make good the deficiencies that accrue to possible conditions of abnormality; or, to employ the words of the genial Fothergill, "there exists a species of capital—a physiological fund into which man can pay, or draw from, according to his necessities." By means of this reserve force, it is possible to sustain life even when the system is wholly deprived of food for a little less than a fortnight, while with slight daily accessions of nourishment it may be maintained for a much longer period. In acute disease the reserves enable the system to tide over the periods of excessive or abnormal waste, even though there is left behind an organism enfeebled and reduced in bulk and in weight. Thus it will be seen that it is a matter of vital importance to the physician to be able to estimate fairly the extent and amount of reserves that obtain in each individual case.

As an invariable rule in excess of waste over repair, the reserves first disappear almost completely; the blood next diminishes about three-fourths; the digestive organs and muscular system each more than one-half; while the nervous system is least affected of all.

The most prominent feature of disease then, and one common to all, is rapid diminution of the nitrogenous and carbonaceous elements. There is impoverished blood owing to disturbance in the relation of the conditions of supply and demand, whereby the force and frequency of the heart's action is diminished, that, prolonged, secures fatality through "heart failure." In the meantime the respiratory acts are interfered with, and the exhalations of carbonic acid decreased gradually and progressively, contributing by a corresponding lack of oxygen to the fatal results. Thus the organism quickly loses its power of maintaining uniform temperature, so essential to well being; febrile movement and general excitation are enhanced; finally comes disturbance of the mental faculties, amounting, perhaps, to delirium.

Such are phenomena that attend in greater or less degree every malady, since any morbid state must be dependent upon disturbance between the normal relations of waste and repair. To restore this balance, by removing the offending cause, and by aiding Nature in her efforts to restore, is the province of therapeutics; and here many fail, simply because accustomed to regard the relations of therapeusis to disease as matters of purely mathematical import, addition and subtraction, instead, as in reality, of conservation and compensation. In this connection the question of nourishment demands always first consideration; it is paramount to medication.

The chief source of the blood supply being food, it follows that its careful selection and preparation are among the most pressing necessities of daily life. To expect to maintain healthy blood by scanty or improper nutriment is as futile as to hope that healthy nutrition of tissue can be maintained by an insufficient or morbid circulation. There is, for example, no better physiological axiom than that the production of muscular activity depends upon a free supply of pure arterial blood, this supply being needed to facilitate that incessant transformation which is the necessary condition of molecular action, as well as to replace waste. Of the various alimentary principles, not one, singly, is capable of maintaining the normal condition of the blood, save for a very limited period. The value of every diet table, and of every substance employed as food, then, does not depend upon the amount of any one

alimentary principle it may contain, but upon its possession of several blended in proper proportions, and the facilities offered for palatable transformations.

Of the four organic elements composing the body, nitrogen and carbon demand to be supplied most freely, inasmuch as the phenomena of nutrition arise from the chemical interchange of these elements with the co-operating influences of oxygen and hydrogen, and certain salts. The nitrogenous substances are those capable of being converted into the albumen and fibrin of the blood, and subsequently assimilated by the tissues, and are in part heat-giving, though chiefly indispensable for the formation of muscle and nerve material; the fatty aliments also are essential to nutrition, since they are both plastic (nitrogenous) and calorifacient. Thus, to conserve and keep up mechanical force, the latter must be supplied in due proportion just as the albuminates are supplied. The carbo-hydrates, chiefly combustible or heat-giving, are not plastic. In addition, it is essential that certain salts and a proportion of water be provided, which, fortunately, are largely present in those substances usually employed to satisfy the cravings of appetite.

As before intimated, disease at all times is a form of inanition, the demands of waste exceeding those of supply, when the reserve force must be called upon, the limit of which is death. The appetite, therefore, becomes a matter of importance from the very beginning of the malady; it is an index, so to speak, of vitality, since, if nourishment can be readily partaken of, there is a partial guarantee of offset to waste, and the outlook is favorable. On the contrary, if anorexia supervenes, the prospect darkens, as it is *prima facie* evidence the digestive functions are deficient and no longer capable of converting available nourishment into force. Again, the organic operation involved in nutrition, and also in the retrograde change of decay, can only go on at normal rates so long as a standard limit of temperature is maintained; the proper progress of the action of life implies a corresponding adjustment of heat irrespective of the bulk of the individual.

Increased temperature tells of disproportionate combustion of carbon, and consequently increased waste. This is the febrile state, whereby Nature endeavors to compensate by distributing the "wear and tear" evenly throughout the economy. To supply the place of the fuel consumed by abnormal combustion, the entire organism is laid under contribution, and there is corresponding lack of secretion, and consequently of function and activity. Thus anorexia is often the first evidence of an insidious onslaught of phthisis, the digestive organs being depleted to compensate for the waste incident to a diseased lung; the supply of blood that should stimulate the nutritive function and support in normal activity is withdrawn at the expense of the digestive fluids. The nerve-endings, that before conveyed sensations in response to demand, are deprived of nourishment and obtunded—decreased in vitality, perhaps languish in semi or total idleness—and by manifestations we are pleased to denominate pain, clamor for a restoration of the lacking blood supply.

Herein we see the philosophy of the exhibition of remedies calculated to stimulate the digestive function to renewed activity; here the complementary foods, tea, coffee, alcohol, may serve good purpose, in connection with bland aliments easy of assimilation and that at the same time tax as little as possible the crippled resources of the digestive economy. Again, the class of nourishment is a matter of paramount moment, as the perverse and ailing stomach and duodenum demand to be cajoled rather than driven. Sufficient blood of proper quality can not be had so long as

there is a deficiency; force can not be developed except through the customary source of energy, for it is both bad and dangerous economy to "rob Peter to succor Paul."

If to force digestion then is dangerous, but one measure is avoidable, and that to compensate artificially for that which may be lacking. In other words, Nature must be copied; while gently stimulated to renewed activity, at the same time she must not be taxed beyond her available resources. It was attempts in this direction that led to the use of digestive ferments and predigested foods, whereby the stomach, duodenum and accessories might be aided in their functions, and the lacteals and portals supplied with the desired nitrogen and carbon for conveyance to the circulation. These were first given by themselves that they might intercept the nourishment and insure its proper transformation during its passage through the *primæ viæ*, but latterly it has been found less taxing to also add to the food prior to its ingestion, and thereby save the stomach and intestines, already deficient in secretion, much labor that would otherwise be necessary. Besides, the diet of the ill and convalescent must be prepared in consonance with the demands and abilities of each individual organism, the problem being, the greatest supply of nourishment available to generate vital force, with the least possible expenditure of that in reserve.

In closing it may be well to say a word regarding nutritive enemata. It is a well-recognized fact that there are occasions when it becomes necessary to support the vital organism otherwise than through the mouth, and under such circumstances it becomes desirable to ingest *per rectum*. Here, however, we are encountered by the physiological fact that all digestion ceases at the ileo-cœcal valve—is carried on above it. Starch must be converted into soluble products before it can be taken up by the lower bowel, and proteids must be converted into peptones; fats are practically useless. Again, the bowel is adapted only to absorption. If aliment be introduced *per anum*, it must necessarily first be subjected artificially to a process similar to that which takes place normally in the small intestine. The ileo-cœcal valve, as already remarked, practically bars their entrance into the region where digestion, as differentiated from mere absorption, takes place. If not predigested, it is not fit for absorption. Hence nutritive enema, then, should consist of soluble carbon-hydrates, meat peptone and alcohol.—*From "The Medical Age."*

PEPTONOIDS LIQUID.

This preparation represents **BEEF PEPTONOIDS** in the form of an elegant cordial, all constituents being entirely digested and ready for assimilation.

LIQUID PEPTONOIDS is a nourishing peptogenic liquid stimulant with the albuminoids in a soluble state, with only sufficient spirits added to preserve it. It contains the largest amount of albuminoid principles and the least amount of alcohol that is possible to use and make a stable compound.

LIQUID PEPTONOIDS will keep indefinitely; its flavor and palatability are such that many who have taken it liken it to a delicate cordial. It will readily be taken by patients who are unable to injest food in any other form (in these cases it has been found of the greatest service). In convalescence from fever and other diseases, in loss of appetite, weak digestion and gastritis its effects are positive, and it will never fail to give perfect satisfaction.

There is no preparation in the market that has been recommended so highly by physicians who have carefully tested it.

DOSE.—For an adult, one tablespoonful three times to six times a day; children in proportion.

LIQUID PEPTONOIDS, WITH COCA

There is no question of the great value of Coca as a stimulant in many diseases, but whenever it is used alone there must be a corresponding reaction. If the brain and muscles are stimulated there must be a waste of tissue, and this waste must be repaired by assimilation and reconstruction, which can only take place by rest and nutrients.

Acting upon this theory, we combined Coca with LIQUID PEPTONOIDS, believing that the nutritive constituents in LIQUID PEPTONOIDS, being perfectly digested and ready for immediate absorption, would resupply the waste so quickly that no reaction from the stimulating properties would occur.

The results of repeated trials have confirmed our belief in every instance.

Our experiments convince us that Coca should seldom be used, to get its best effect, except when combined with some nutritive elements ready for assimilation.

The depressing effect of the reaction from the use of Coca or any stimulant, goes very far towards neutralizing the benefits derived, and we are confident the above is the only way to prevent it.

DOSE.—For an adult, one tablespoonful three to six times a day; children in proportion.

Correspondence Solicited.

THE ARLINGTON CHEMICAL CO.,

Successors to REED & CARNRICK, **YONKERS, N. Y.**

For PEPTONOIDS and PHOSPHO-CAFFEIN.

PHOSPHO-CAFFEIN COMP.

(GRANULAR EFFERVESCING.)

A SEDATIVE NERVE AND BRAIN FOOD.

Formula for each Dessertspoonful.

℞ Caffein.
Acidi Phosphorici āā grains, ss.
Antipyrin.
Ext. Apii. Grav. dulc. (Celery) āā grains, i.
M Sodium Bromide, grains, v.

DOSE.—For an adult, one or two heaping teaspoonfuls.

Repeat the dose once at expiration of fifteen minutes, and again in half an hour if required.

This preparation has been thoroughly tested and found to produce the happiest effects in *Headaches*, *Neuralgia*, *Insomnia*, *Neurasthenia*, and *General Nervous Irritability*. We are confident that the above combination will be found superior to any of the various preparations that are used in these affections. It is not only a nerve sedative, but a Brain and Nerve Food.

The effects of Phospho-Caffein Comp. in the above affections are not due to any one of the ingredients, but to the happy effect of the combination. This formula, with six others, was thoroughly tested in many cases before we commenced its manufacture.

PUT UP IN EIGHT-OUNCE BOTTLES.

The following letter is from a Physician holding one of the highest positions in the United States.

February 4, 1889.

Many thanks for your courteous favor of the 2d inst., and for the Pancrobilin and Caffein preparations. The latter cured three headaches before it had been in my hands twelve hours; one case was that of a lady who told me she had had a continuous headache for two months. I shall frequently have occasion to recommend it. Faithfully yours,

.....

STERLING, ILL., January 19, 1889.

Gentlemen:—Allow me to congratulate you upon the efficient and elegant combination, Phospho-Caffein Compound, for headaches, neuralgia, insomnia, neurasthenia and general nervous irritability. I have never found its equal. I have had the satisfaction of getting early and satisfactory results, and therefore cheerfully recommend it to the general practitioner as a valuable combination.

Very truly yours, JNO. B. CRANDALL, M. D.,
Health Commissioner City of Sterling.
Pres. U. S. Exam. Board of Surgery for Pensions.

Correspondence Solicited.

THE ARLINGTON CHEMICAL CO.,

Successors to REED & CARNRICK, for **YONKERS, N. Y.**

PEPTONOIDS BEEF (POWDER). PEPTONOIDS LIQUID, WITH COCA.
PEPTONOIDS LIQUID. PEPTONOIDS, IRON AND WINE.
PHOSPHO-CAFFEIN COMPOUND.